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Proceeding of International Conference On Research, Implementation And Education Of Mathematics And Sciences 2014, Yogyakarta State University, 18-20 May 2014

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THE USE OF LOCAL CONTEXT IN DESIGNING LEARNING ACTIVITIES FOR MATHEMATICS TEACHING IN ELEMENTARY SCHOOL

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Abstract

The new curriculum named "*Kurikulum 2013*" has been used from Elementary to Senior Highschool in Indonesia since the year of 2013. A significant change that occurs is the use of scientific approach in learning where students have to observing , questioning, experimenting, associating and networking. One of the recommended learning model is a model of problem-based learning where students are expected to find the concept by working through a particular problem. However, the main problem for the teacher in using this model is difficulty in designing problem scenario. The goal of this reasearch is to develop mathematics instructional material for elementary school by using local context such as folk game and tradition. The study begin by analyzing the contents of mathematical thinking in various folkloric traditions and the game in Riau . On the basis of mathematical ideas found in each game and tradition researcher design learning activities to be used in mathematics class. The product of this study are students book of mathematics that can be used in addition to the books published by the government in the implementation of the curriculum in 2013 . In the process of these book has been tested at elementary school that will use it. These book facilitate elementary student in mathematics class in observing, questioning, experimentating, associating and networking as recomended in implementing new curriculum.

Keyword: Mathematics Education, Curriculum 2013, Folkgame

INTRODUCTION

Curriculum 2013 has been declared by the government and gradually put into implementation in 2013. Various activities being prepare for the implementation, ranging from teacher training to the provision of books to be used by teachers and students. The geographical situation of Indonesia and diversities in citizen characteristic making is not easy to implement new Curriculum 2013. Government is well aware of this diversity in the characteristics and uniqueness of Indonesia, because there are differences in terms of geography, resources, availability of facilities and infrastructure, backgrounds and socio-cultural conditions, and various other diversity in each region.

These diversities has an impact on the level of the needs and challenges of development between different regions in improving quality of the life of the community in every area. In the development of education, each region has their regional education characteristics. Similarly, the curriculum as heart of educational process should be developed and implemented to respond to the needs of local context, educational unit, and students need. Basically this was facilitated by the government through The Act No. 20 of 2003, which is one of the fundamental

considerations, the curriculum facilitated the potential diversity of the area and the surroundings. Each of these areas requires appropriate education to regional characteristics and experiences of everyday life.

The curriculum was developed by taking into account socio-cultural characteristics of the local community and support the preservation of cultural diversity. Acception and the appreciation of the local culture need to be grown first before studying the culture of othr region or other countries. A culture that developed in the community that very close to the students lifs is a game (folk). Those games is a tradition passed down society and being part of their routine activities. Traditional games usually using the tools that are simple and easy to get around in the local community.

Because the curriculum in 2013, providing a space for the use of the local context, researcher conducting the research about the use of traditional games as one of the local context for mathematics learning in elementary schools. The reason is because using games for learning mathematics will match primary school student who are in concrete level of thinking and children at this age ofcourse like to play. In addition, it is hoped that this will help revive traditional games that have started to disappear in the community. This is also inline with the structure of the curriculum for primary schools in 2013, where the scope of learning for elementary school students are their home and neigbourhood.

In the study, students were facilitated to actively develop their potential into competence. Teachers provide a learning experience for the students through variety of activities that allow them to develop to their potential into competence that match the standards of curriculum. The developmet in learning activity covering of attitudes, knowledge and skills in varying combinations and focus. Each learning activity has a different approach depending on the nature of learning material.

Curriculum in 2013 view that knowledge can not be transfer from the teacher to the student. Students are subjects that have the ability to actively seek, process, build and use the knowledge. To reach the goal of of the curriculum learning activity is designed by using principles: (1) are student-centered, (2) developing the creativity of students, (3) creating a fun and challenging conditions, (4) enriched by values, ethics, aesthetics, logic and kinestetics, and (5) provide a varied learning experience through the implementation of various strategies and methods of joyful learning, contextual, effective, efficient and meaningful. In the study, students are encouraged to discover by themselves and transforming complex information, comparing new information to what they knew, and to using information or opportunities as they needed in the life environment.

The main problems of teachers in the implementation of the curriculum, apart from the preparation of lesson plans is to design learning process that allows students to actively explore concepts through given activities. Learning materials produced through this research will helps teachers to facilitate students to work in accordance with the requirements of the curriculum 2013. Learning activities is design by using scientific learning where student start activities by observing, asking questions, reasoning, communicating and evaluating.

The aim of this study to produce in the students book for mathematics learning with the title " Mathematics within Traditional Games of Riau. These books can be used in class 1-3 Elementary School in addition to the book provided by the government. The book is design in the form of student activity in learning as required by mathematical topics and subtopics in curriculum 2013. This research product will be useful for primary school teachers in enriching thematic mathematics learning. It will also make the fun learning as they presented by using the game that was new to students. Beside having fun mathematics, the use of traditional folk games will also help to preserve the tradition of Malay and helping the student to enshape their attitude.

RESEARCH METHOD

This study is classified as a development research that intends to produce teaching materials in the form of a book of mathematics. This study also look for a prakticalities of the product. This development research used the model of education design by Plomp (2011), which consists of five phases. The development stages are: (i) the initial research, (ii) the design (III) phase of construction / building, (IV) phases of testing, evaluating and revising, and (F) implementation. In this study, given the limitations of time and funding development only done up to phase 4.

In the first phase of the research analyze of mathematical thinking or concept that can be found in the traditional games. Besides, it also analyzes the content of the elementary mathematics curriculum includes core competencies (KI) and basic skills (KD). Next activities is analyzing the teaching materials that suitable for founded core competencies and basic skill. This material will be used for preparation of the draft of the product the book of Mathematical within traditional Games of Riau.

In the design phase with respect to the initial research stage, researchers design activities and teaching materials will be used in designing students book based on the traditional folk games of Riau. Activities in this phase is to design the pattern of presentation of teaching materials, collecting materials needed for the production of teaching materials, such as primary teaching materials as well as pictures of traditional folk games of Riau. Instrument for product validation and practicalities alson design in this stage.

In the realization phase, researchers develop the book for mathematics learning based on traditional folk game of Riau, in accordance with the first and second phase. The learning material developed by using the pictures and step of playing Riau traditional folk games. Using corresponding folkgame picture to the learning material will help improving students' interest in learning mathematics. The language using in this mathematics learning materials is simple and easy to understand by elementary student.

The last stage is the test phase. In this stage the product is evaluated and validated by experts before revising to meet the better learning material requirement. Validation results are used as a basis for the revision of the initial development materials. Following the revision of teaching materials is tested in small groups of 5 students. The results of the review of the raw material used for FGD with elementary teachers who will use the book later.

RESULT AND DISCUSSION

The result of the research presented in two part. The first part is the finding of mathematical thinking in the traditional games. The second part is the sample of learning activities found on the book of Mathematics Within Traditional Games.

The Game of Besimbang

In the game besimbang mathematical concepts and ideas that can be used for learning mathematics is a concept of circle drawn from player sitting position which run in a circle. Next is counting skill, in the game each player has to knows how many bean will be used, it could be five or six beans. If they play five, then the player is counting beans up to five, and when playing six, then the player is counting bean to six. The concept of addition and substraction also found when the player put the beans on the ground, or taking it from the ground. Comparing skill is used when they need to decide which players will go first, the

second, third, and so on, the player must know the "less than (<)" or "more than (>)" of two or more numbers.

The addition also is used as the player takes Simbang seeds one by one, a process of adding for countingthe number of bean in the hands and at the same time subtraction is used to count the number of bean left on ground. Multiplication is used when a player takes Simbang bean one by one, than the multiplication process occurs in counting the beans on the hands, the number of beans multiplied by the number of processes, while the distribution is shown as the player takes Simbang beans one by one then the division process takes place on the floor.

The Games of *Congkak*

The game of congkak in general can be used in learning the basic operation of mathematics that found in low grade elementry school. Mathematical operations that can be used is the addition, subtraction and division. Division is used when a player fills a the main hole of the players that make the process of the division 49: 7 = 7. The operation of substraction is used when each beans were dropped one by one in the hole, on the other side, the addition is happens when bean dropped into the player main hole which will be the number in deciding the winner will be the end of the game.

The Games of *Galah*

At the games of Galah mathematic concepts found are the concept of geometry. Among them is the introduction of longer/ shorter in comparing length. Understanding the characteristics of two dimentional figures that used in the area of the games.

The Games of *Guli*

The area of Guli area is made in the shape of a circle with the hole in the center where players will try to insert their guli. It can be used to introduce the concept circle and circumference where the point in the center having the same distance into all the point the circumference of a circle. Mathematical skills also found in the game due Guli is measurement. Each player gets a chance to throw their guli to hole by measuring the nearest distance. The order of the players will be drawn by measuring the distance of throwing Guli, ranging from the Guli who has placed to the bottom of the hole. Players who throw Guli at the shortest distance will play first. To perform this activity the comparing is needed, the player has to know the concept of "less than (<)" or "more than (>)" of two or more numbers.

The game of *Setatak*

Analysis Mathematics thinking in the Games of Setatak will be divided in two categories, arithmetic and geometry . Arithmetic only found in games of *setatak lengser* where each player should cound and record number of points obtained from each throw of *ucak* into the box . Through *setatak lengser* the children introduce the concept of counting , adding and comparing the point they get. Geometrical concepts can be found in all kinds of games *setatak* . Area used in the game can be used for identification of flat areas such as square , rectangle , triangles , trapezoids and circles. Through this area teacher can also ask the children to look around to find similar two dimentional figures . the concept of symmetry can also be used in the games of *setatak*

The Tradition of *Lampu Colok*

In drawing the sketch replicated the composition of the light the student can be taught the concept of comparison , where children have to use the concept of size comparison with the full-size image . In preparing materials to be used such as wood , rattan , bottles or cans will be found the skill of counting , measuring, the concept of symmetry and the volume of silinder.

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The Tradition of *Malamang*

In this *malamang* tradition , perceived mathematical concept in determining the volume of a silinder. Before using the bamboo they need to measured the length and diameter of bamboo then be able to determine how much rice is needed to fill the bamboo. The banana leaves are used inside the bamboo, they need to find out the area of banana leave needed.

From the above analysis the game that can be used for first grade student are Setatak and congkak, while traditions are used malamang and lampu colok. For the second grade student the games tobe used are congkak, setatak and galah, the tradition are using malamang and lampu colok. Games that used for grade three are Ligu, Rimau, Gasing, Setatak and Congklak

SAMPLE OF LEARNING ACTIVITIES

Figure 1: Cover of the books

Learning Acitivity 1

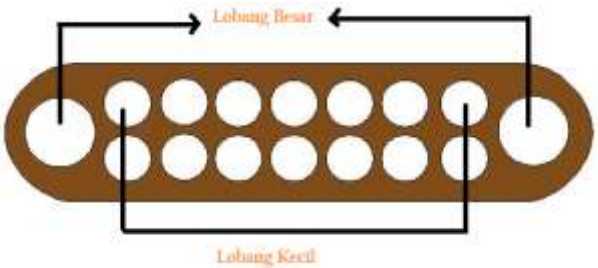

Figure 2: Picture used in the book 1

By giving above picture student were asked to discuss the following quetion:
How many hole can be found in the game of congkak above?
How many big hole can be found in the game of congkak above?
How many small hole can be found in the game of congkak above?

Learning Acitivity 2

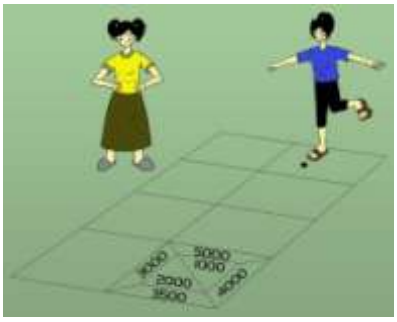

Figure 3: Picture used in the book 2

Given above picture students were asked to discuss the following problem.
Dina dan Sasa plaing the game of *setatak lengser*. On the last square, *ucak* Dina fall on the square with number 4000 in it. If Dina received her money with coin of Rp 500,00, howmany coin will Dina get?

Learning Activity 3:

Figure 4: Picture used in the book 3

Given above picture the students were asked to discuss the following problem:
Andi, Budi, Doni dan Wawan playing *the game of gasing*. They take turn in playing, the time

of their gasing spined show in the above picture. Discuss with your group who is having the longest and the shortes time in play.

CONCLUSION

1. The used of folk game and tradition as the local context is very helpfull, yet not all of the folkgame and traditions are well documented, very rare literature found about this topics.
2. The folk games in Riau has similarity with the folkgames in other area, so this book could be used in Riau as can also be applied to other region in Indonesia.
3. Most of the folkgame beeing analyzed we found the mathematical concept but for safety reason, some of the game do not recomended to be used at the elementary schools student.
4. The folkgame that used in developing the book Mathematics within Traditional Games are Besimbang, Galah, Rimau, Gasing, Setatak, Ligu dan Guli.
5. Tradition being used for the books are Malamang and Lampu Colok.

SUGGESTION

1. Found the difficulties on obtaining literature about Riau folkgame and tradion, we suggest the local governent through the office of Tourism and Department of Education publish the book about this topics.
2. Some of the folkgames can be found in the museum of Riau, we suggest the museum of Riau add their collection about the traditional games to help children knowing their culture.
3. The games has been analyzed for concept of mathematics, it should also analyzed for other topics since the learning in elementary school deliver in integrative thematics.
4. The use of folk games and tradition not only help children learning mathematics but also help preserve the local culture, for that reasong we recommended the government through department of education provide support for school to use this book.

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